CLAIMS

1. A method of estimating properties of an earth formation, comprising the steps of:

evaluating a model to generate predicted values for a plurality of electrical signals measured in a borehole in the earth formation as a function of a first set of model electrical parameters, a second set of model electrical parameters, and model spatial coordinates of boundaries between regions of the earth formation;

transforming the plurality of electrical signals to produce transformed electrical signals;

transforming the model values for the plurality of electrical signals to produce transformed model values; whereby, the transformed electrical signals are approximately equal to the transformed model values; and

correlating a first set of earth formation electrical parameters with the first set of model electrical parameters.

2. The method of claim 1, wherein the step of transforming the plurality of electrical signals comprises an identity transformation whereby the transformed electrical signals are equal to the measured electrical signals.

3. The method of claim 1, wherein the step of transforming the model values comprises an identity transformation whereby the transformed model values are equal to the model values.

4. The method of claim 1, wherein the step of transforming the plurality of electrical signals comprises an identity transformation whereby the transformed electrical signals are equal to the measured electrical signals and wherein the step of transforming the model values comprises an identity transformation whereby the transformed model values are equal to the model values.

5. The method of claim 1, wherein the transforming steps account for differences between a measurement device to measure the plurality of electrical signals and the model of the measurement device.

6. The method of claim 1, wherein the second set of model electrical parameters are transformed to depend on the first set of model electrical parameters.

7. The method of claim 1, further comprising the step of:

correlating a second set of earth formation electrical parameters with the second set of model electrical parameters.

8. The method of claim 1, further comprising the step of:

correlating a set of spatial coordinates for boundaries between regions of the earth formation with the model spatial coordinates.

9. The method of claim 1, wherein the first set of model electrical parameters is a set of conductivity values and the second set of model electrical parameters is a set of dielectric constant values.

10. The method of claim 1, wherein the model is a function of conductivity values associated with an invaded region of the earth formation, dielectric constant values associated with the invaded region of the earth formation, conductivity values associated with a virgin region of the earth formation, dielectric constant values associated with the virgin region of the earth formation, and a radius of the invaded region of the earth formation.

11. The method of claim 1, wherein the model accounts for frequency dispersion of the first set of model electrical parameters.

12. The method of claim 1, wherein the model accounts for frequency dispersion of the second set of model electrical parameters.

13. The method of claim 1, wherein the model spatial coordinates represent step-like boundaries for the first set of model electrical parameters and the second set of model electrical parameters.

14. The method of claim 1, wherein the transformed electrical signals and the transformed model values are relatively sensitive to the first set of model electrical parameters and relatively insensitive to the second set of model electrical parameters.

15. The method of claim 1, wherein the transformed electrical signals and the transformed model values represent phase resistivity values.

16. The method of claim 1, wherein the transformed electrical signals and the transformed model values represent attenuation resistivity values.

17. The method of claim 1, wherein the transformed electrical signals are consistent with hypothetical electrical signals that would be measured by a hypothetical measurement device simpler than an actual measurement device that was used to measure the plurality of electrical signals.

18. The method of claim 1, wherein the step of transforming the plurality of electrical signals comprises the steps of:

generating a plurality of lookup tables, each table containing a first set of values representative of each electrical signal of the plurality of electrical signals and a second set of values representative of each transformed electrical signal of the plurality of transformed electrical signals as a function of at least one electrical parameter; and

determining an estimate of the value of each transformed electrical signal with one or more lookup tables.

19. The method of claim 18, wherein the value of each transformed electrical signal is a weighted sum of values derived from two or more lookup tables.

20. The method of claim 17, wherein the hypothetical measurement device is comprised of infinitesimal antennas and no mandrel.

21. A system, comprising:

means for evaluating a model to generate predicted values for a plurality of electrical signals measured in a borehole in the earth formation as a function of a first set of model electrical parameters, a second set of model electrical parameters, and model spatial coordinates of boundaries between regions of the earth formation;

means for transforming the plurality of electrical signals to produce transformed electrical signals;

means for transforming the model values for the plurality of electrical signals to produce transformed model values; whereby, the transformed electrical signals are approximately equal to the transformed model values; and

means for correlating a first set of earth formation electrical parameters with the first set of model electrical parameters.

22. The system of claim 21, wherein the second set of model electrical parameters are transformed to depend on the first set of model electrical parameters.

23. The system of claim 21, further comprising:

means for correlating a set of spatial coordinates for boundaries between regions of the earth formation with the model spatial coordinates.

24. The system of claim 21, wherein the first set of model electrical parameters is a set of conductivity values and the second set of model electrical parameters is a set of dielectric constant values.

25. The system of claim 21, wherein the model is a function of conductivity values associated with an invaded region of the earth formation, dielectric constant values associated with the invaded region of the earth formation, conductivity values associated with a virgin region of the earth formation, dielectric constant values associated with the virgin region of the earth formation, and a radius of the invaded region of the earth formation.

26. The system of claim 21, the transformed electrical signals and the transformed model values are relatively sensitive to the first set of model electrical parameters and relatively insensitive to the second set of model electrical parameters.

27. The system of claim 21, wherein the step of transforming the plurality of electrical signals comprises an identity transformation whereby the transformed electrical signals are equal to the measured electrical signals.

28. The system of claim 21, wherein the step of transforming the model values comprises an identity transformation whereby the transformed model values are equal to the model values.

29. The system of claim 21, wherein the step of transforming the plurality of electrical signals comprises an identity transformation whereby the transformed electrical signals are equal to the measured electrical signals and wherein the step of transforming the model values comprises an identity transformation whereby the transformed model values are equal to the model values.